

Report to the US Nuclear Data Program

26 April 1999

TUNL Nuclear Data Evaluation Project

Triangle Universities Nuclear Laboratory

1 Personnel

| | | | |
|----------------|-----------------|---------------------------------------|-------------------------------|
| Staff: | Mari Cheves | Project Coordinator | Duke/TUNL |
| | Jennifer Godwin | Research Secretary | Duke/TUNL |
| | John Kelley | Research Associate (50% Data Project) | Duke/TUNL |
| | Ron Tilley | Professor of Physics | NCSU/TUNL |
| | Henry Weller | Professor of Physics | Duke/TUNL |
| Collaborators: | Gerry Hale | $A = 5, 7$ | LANL |
| | Hartmut Hofmann | $A = 6, 7$ | Universität Erlangen-Nürnberg |
| | Jim Purcell | Update Lists | Georgia St. University |

2 Publication Status

TUNL is responsible for data evaluations in the mass range $A = 3-20$. The current publication status of these evaluations is summarized below:

| Nuclear Mass | Publication | Institution |
|--------------|------------------------------------|-------------------|
| $A = 3$ | <i>Nucl. Phys.</i> A474 (1987) 1 | TUNL |
| $A = 4$ | <i>Nucl. Phys.</i> A541 (1992) 1 | TUNL ^a |
| $A = 5-10$ | <i>Nucl. Phys.</i> A490 (1988) 1 | Penn ^b |
| $A = 11-12$ | <i>Nucl. Phys.</i> A506 (1990) 1 | Penn ^b |
| $A = 13-15$ | <i>Nucl. Phys.</i> A523 (1988) 1 | Penn ^b |
| $A = 16-17$ | <i>Nucl. Phys.</i> A564 (1993) 1 | TUNL |
| $A = 18-19$ | <i>Nucl. Phys.</i> A595 (1995) 1 | TUNL |
| $A = 20$ | <i>Nucl. Phys.</i> A636 (1998) 247 | TUNL ^c |

^aCo-authored with G.M. Hale, LANL.

^bF. Ajzenberg-Selove, University of Pennsylvania.

^cCo-authored with S. Raman, ORNL.

3 Evaluations in Progress

| Nuclear Mass | Publication | Institution |
|--------------|---|-------------------|
| $A = 5$ | Preliminary version mailed February 1998 | TUNL ^a |
| $A = 6$ | Preliminary version to be mailed April 1999 | TUNL ^a |
| $A = 7$ | Preliminary version in progress | TUNL ^a |

^aCo-authored with G.M. Hale and H. Hofmann.

An “Energy Levels of Light Nuclei, $A = 5-7$ ” review is planned for submission to *Nuclear Physics A* in 1999.

4 WWW Services

TUNL continues to develop new WWW services for the nuclear science and applications communities. In addition to the “Energy Levels of Light Nuclei” publications listed in the table below, Energy Level Diagrams

are provided for $A = 4$ –20 nuclei, and ENSDF material appears in two forms. A new feature has been added which provides descriptions of important research published since the last full evaluation. References are divided into categories of level information, reaction information, decay information, and other properties, with experimental and theoretical subdivisions for each. These “Update lists” are currently online for $A = 6$ & 7 nuclei; lists for other nuclei are being prepared. This item represents the beginning of a new initiative by the TUNL group to provide to the nuclear community via our WWW page a continuously updated guide to important new work that has appeared in the literature since the most recent published review for each nuclide.

Documents Available (or soon to be available) on the TUNL-NDEP Web Site ^a

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|--------------|------------------------------------|-------------------|
| $A = 3$ | <i>Nucl. Phys.</i> A474 (1987) 1 | TUNL |
| $A = 4$ | <i>Nucl. Phys.</i> A541 (1992) 1 | TUNL ^b |
| $A = 5$ –10 | <i>Nucl. Phys.</i> A490 (1988) 1 | Penn |
| $A = 5$ | 1998 Preliminary version | TUNL |
| $A = 6$ | 1999 Preliminary version | TUNL |
| $A = 11$ –12 | <i>Nucl. Phys.</i> A506 (1990) 1 | Penn ^b |
| $A = 13$ –15 | <i>Nucl. Phys.</i> A523 (1988) 1 | Penn ^b |
| $A = 16$ –17 | <i>Nucl. Phys.</i> A564 (1993) 1 | TUNL |
| $A = 18$ –19 | <i>Nucl. Phys.</i> A595 (1995) 1 | TUNL |
| $A = 20$ | <i>Nucl. Phys.</i> A636 (1998) 247 | TUNL |

^aVersions of the *Nucl. Phys. A* articles have been modified slightly from their original form.

^bTo be posted, mid-1999.

5 ENSDF

Since TUNL has begun to produce evaluations of $A = 5$ –20 nuclei, we have also been updating the corresponding ENSDF files. Earlier ENSDF files that contained adopted levels & gammas and β -decay data were produced by M. Martin (ORNL) and M. Bhat (BNL). We are in the process of updating this information as well as adding the specific reaction information. At IAEA-98, TUNL was asked to update the ENSDF file for $A = 2$. This work has been completed. The following table outlines the current status of the $A = 2$ –20 ENSDF files.

| Mass | Content | Publication Center | ENSDF Center ^a |
|-----------|--------------------------------------|------------------------|---------------------------|
| 2 | Levels | Unpublished | TUNL |
| 3 | Levels | TUNL | TUNL |
| 4 | Levels | TUNL | TUNL |
| 5 | Levels | TUNL (preprint) | TUNL ^b |
| 6 | Levels & Gammas,Reactions | TUNL (preprint) | TUNL ^b |
| 7 | Levels & Gammas,Reactions | Penn | TUNL |
| 8 | Levels & Gammas,Reactions | Penn | TUNL |
| 9 | Levels & Gammas,Reactions | Penn | TUNL |
| 10 | Levels & Gammas,Reactions | Penn | TUNL |
| 11 | Levels & Gammas | Penn | BNL |
| 12 | Levels & Gammas,Reactions | Penn | TUNL ^b |
| 13 | Levels & Gammas | Penn | ORNL |
| 14 | Levels & Gammas | Penn | ORNL |
| 15 | Levels & Gammas | Penn | ORNL |
| 16 | Levels & Gammas,Reactions | TUNL | TUNL |
| 17 | Levels & Gammas,Reactions | TUNL | TUNL |
| 18 | Levels & Gammas,Reactions | TUNL | TUNL |
| 19 | Levels & Gammas,Reactions | TUNL | TUNL |
| 20 | Levels & Gammas,Reactions | TUNL | TUNL |

^aWork that has primarily been carried out over the past year appears in boldface.

^bIn progress.